FIG. 1

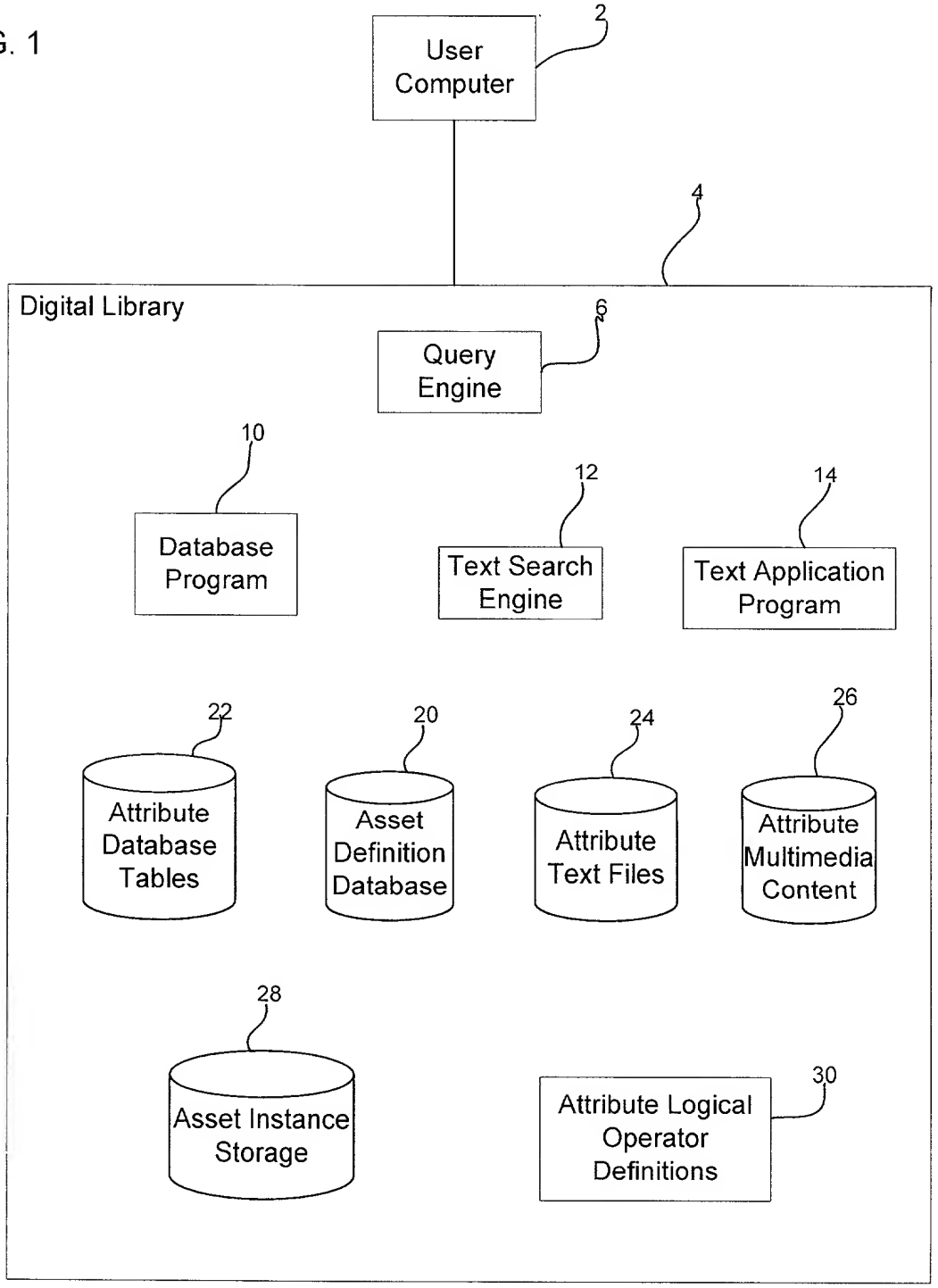
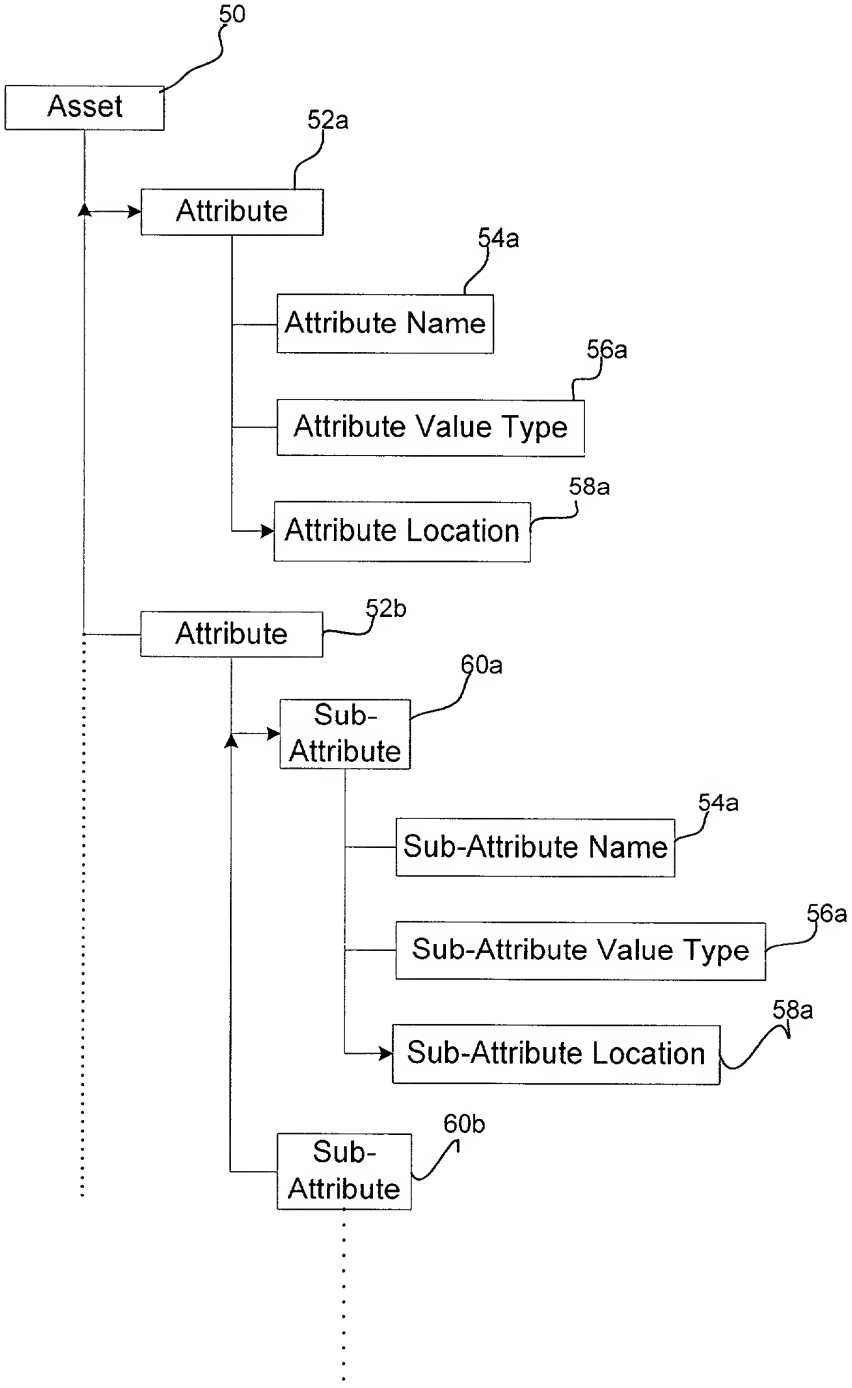

User Computer
2
4
Digital Library
Query Engine
6
10
Database Program
12
Text Search Engine
14
Text Application Program
22
Attribute Database Tables
20
Asset Definition Database
24
Attribute Text Files
26
Attribute Multimedia Content
28
Asset Instance Storage
Attribute Logical Operator Definitions
30

FIG. 2


50
Asset
52a
Attribute
54a
Attribute Name
56a
Attribute Value Type
58a
Attribute Location
52b
Attribute
60a
Sub-Attribute
54a
Sub-Attribute Name
56a
Sub-Attribute Value Type
58a
Sub-Attribute Location
60b
Sub-Attribute

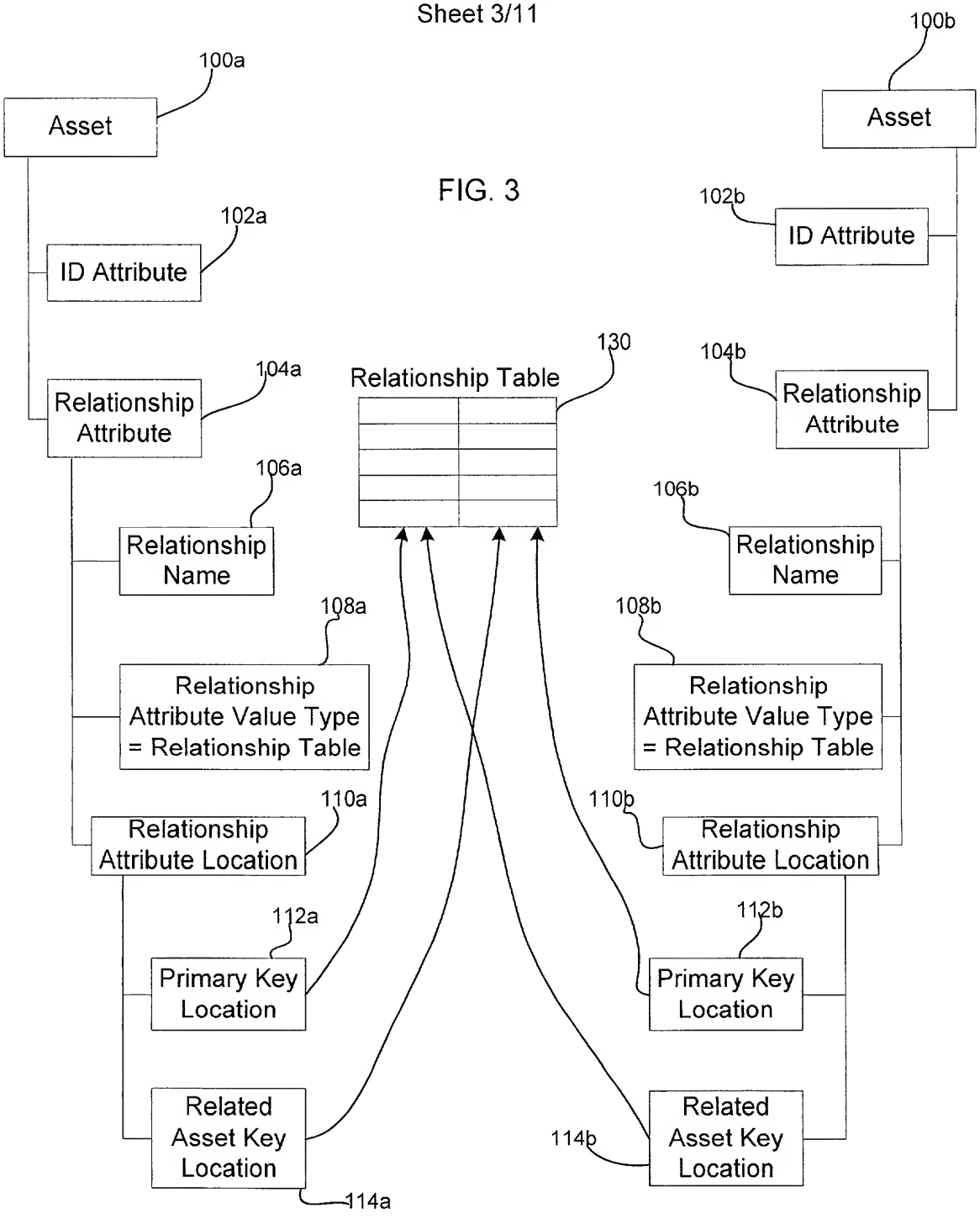

100a
Asset
100b
Asset
102a
ID Attribute
102b
ID Attribute
130
Relationship Table
104a
Relationship Attribute
104b
Relationship Attribute
106a
Relationship Name
106b
Relationship Name
108a
Relationship Attribute Value Type = Relationship Table
108b
Relationship Attribute Value Type = Relationship Table
110a
Relationship Attribute Location
110b
Relationship Attribute Location
112a
Primary Key Location
112b
Primary Key Location
Related Asset Key Location
114a
114b
Related Asset Key Location

FIG. 3

FIG. 4a

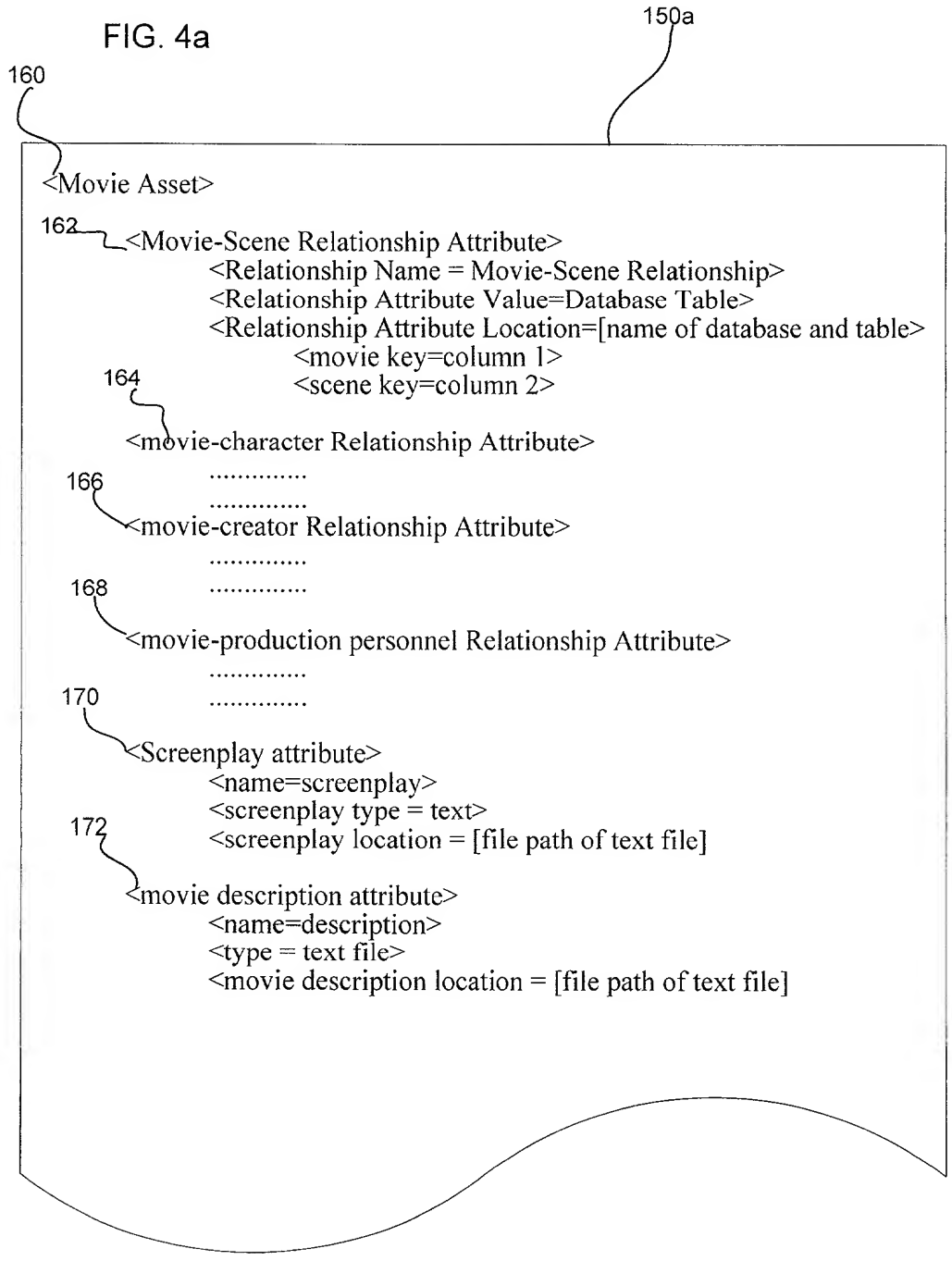

150a
160
<Movie Asset>
162
<Movie-Scene Relationship Attribute>
<Relationship Name = Movie-Scene Relationship>
<Relationship Attribute Value=Database Table>
<Relationship Attribute Location=[name of database and table>
<movie key=column 1>
<scene key=column 2>
164
<movie-character Relationship Attribute>
.....
.....
166
<movie-creator Relationship Attribute>
.....
.....
168
<movie-production personnel Relationship Attribute>
.....
.....
170
<Screenplay attribute>
<name=screenplay>
<screenplay type = text>
172
<screenplay location = [file path of text file]
<movie description attribute>
<name=description>
<type = text file>
<movie description location = [file path of text file]

FIG. 4b

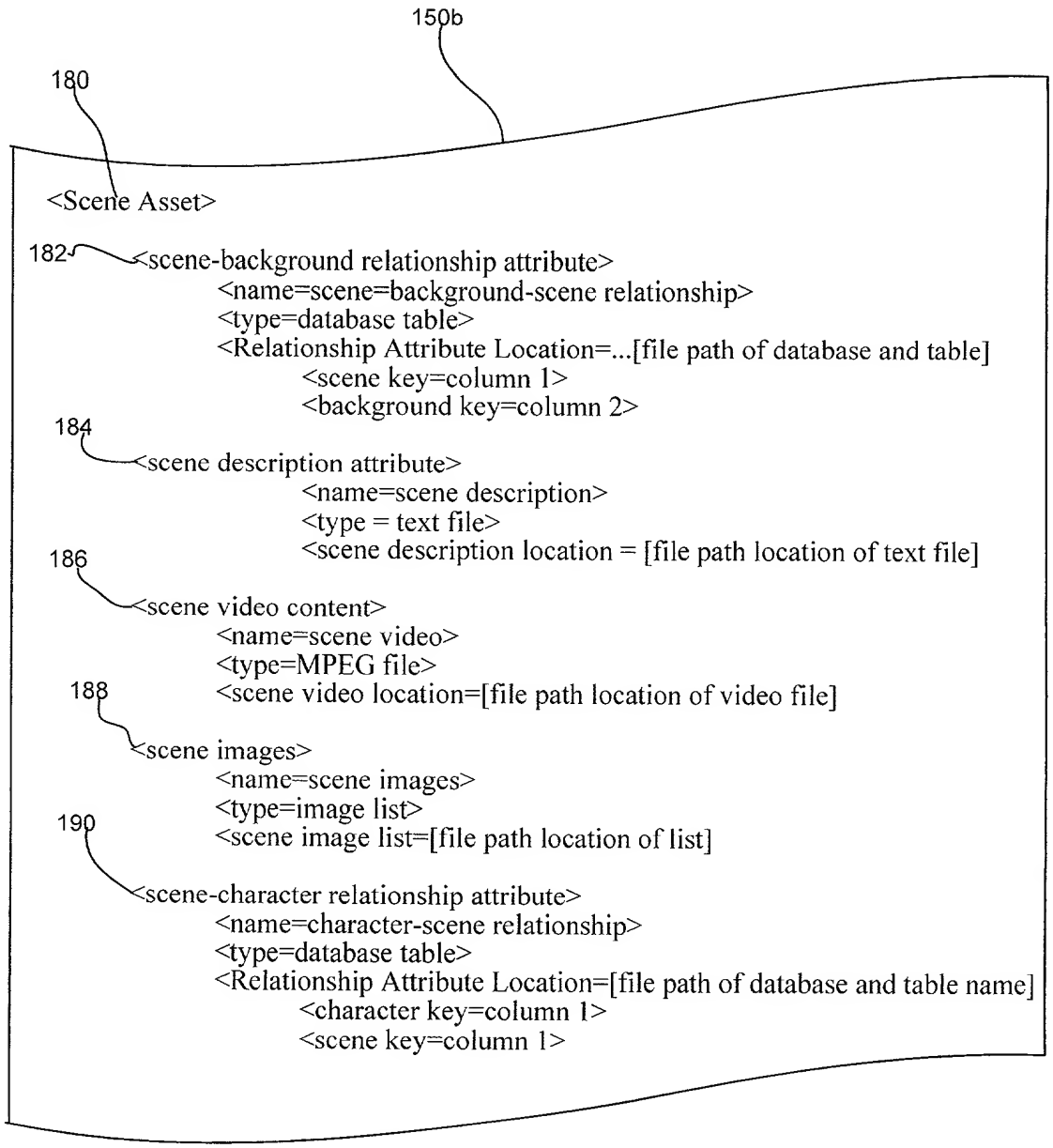

150b
180
<Scene Asset>
182
<scene-background relationship attribute>
<name=scene=background-scene relationship>
<type=database table>
<Relationship Attribute Location=...[file path of database and table]
<scene key=column 1>
<background key=column 2>
184
<scene description attribute>
<name=scene description>
<type = text file>
<scene description location = [file path location of text file]
186
<scene video content>
<name=scene video>
<type=MPEG file>
188
<scene video location=[file path location of video file]
<scene images>
<name=scene images>
<type=image list>
190
<scene image list=[file path location of list]
<scene-character relationship attribute>
<name=character-scene relationship>
<type=database table>
<Relationship Attribute Location=[file path of database and table name]
<character key=column 1>
<scene key=column 1>

FIG. 4c

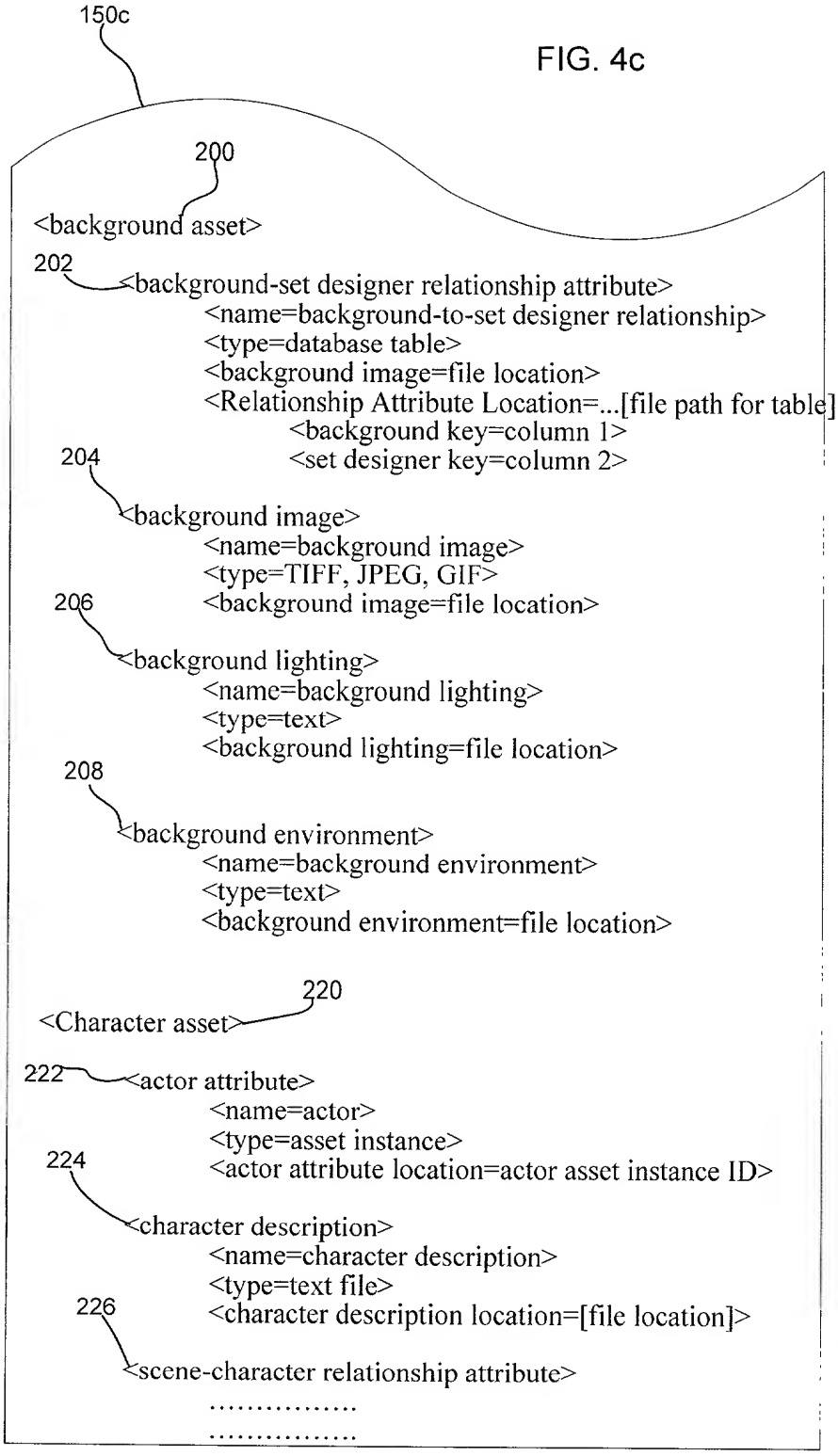

150c
200
<background asset>
202
<background-set designer relationship attribute>
<name=background-to-set designer relationship>
<type=database table>
<background image=file location>
<Relationship Attribute Location=...[file path for table]
<background key=column 1>
<set designer key=column 2>
204
<background image>
<name=background image>
<type=TIFF, JPEG, GIF>
<background image=file location>
206
<background lighting>
<name=background lighting>
<type=text>
<background lighting=file location>
208
<background environment>
<name=background environment>
<type=text>
<background environment=file location>
220
<Character asset>
222
<actor attribute>
<name=actor>
<type=asset instance>
<actor attribute location=actor asset instance ID>
224
<character description>
<name=character description>
<type=text file>
<character description location=[file location]>
226
<scene-character relationship attribute>
.....
.....

FIG. 5

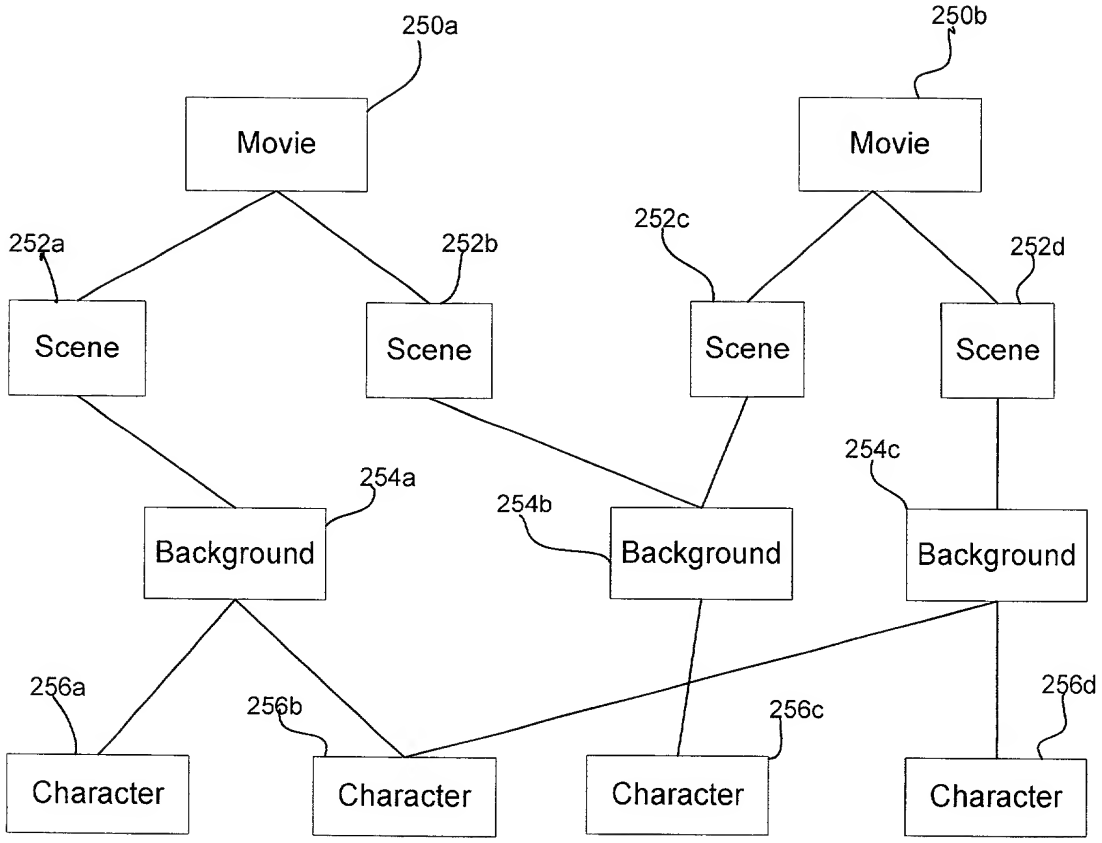

250a
250b
Movie
Movie
252a
252b
252c
252d
Scene
Scene
Scene
Scene
254a
254b
254c
Background
Background
Background
256a
256b
256c
256d
Character
Character
Character
Character

FIG. 6

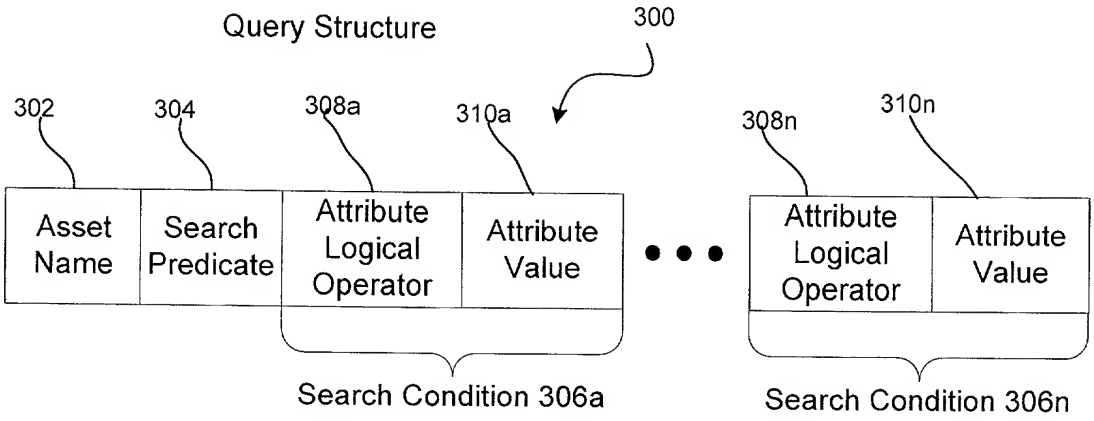
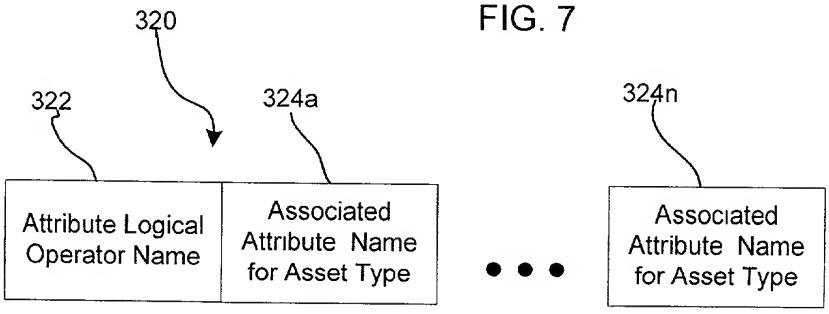

Query Structure
300
302
304
308a
310a
308n
310n
Asset Name
Search Predicate
Attribute Logical Operator
Attribute Value
Attribute Logical Operator
Attribute Value
Search Condition 306a
Search Condition 306n

FIG. 7


320
322
324a
324n
Attribute Logical Operator Name
Associated Attribute Name for Asset Type
Associated Attribute Name for Asset Type

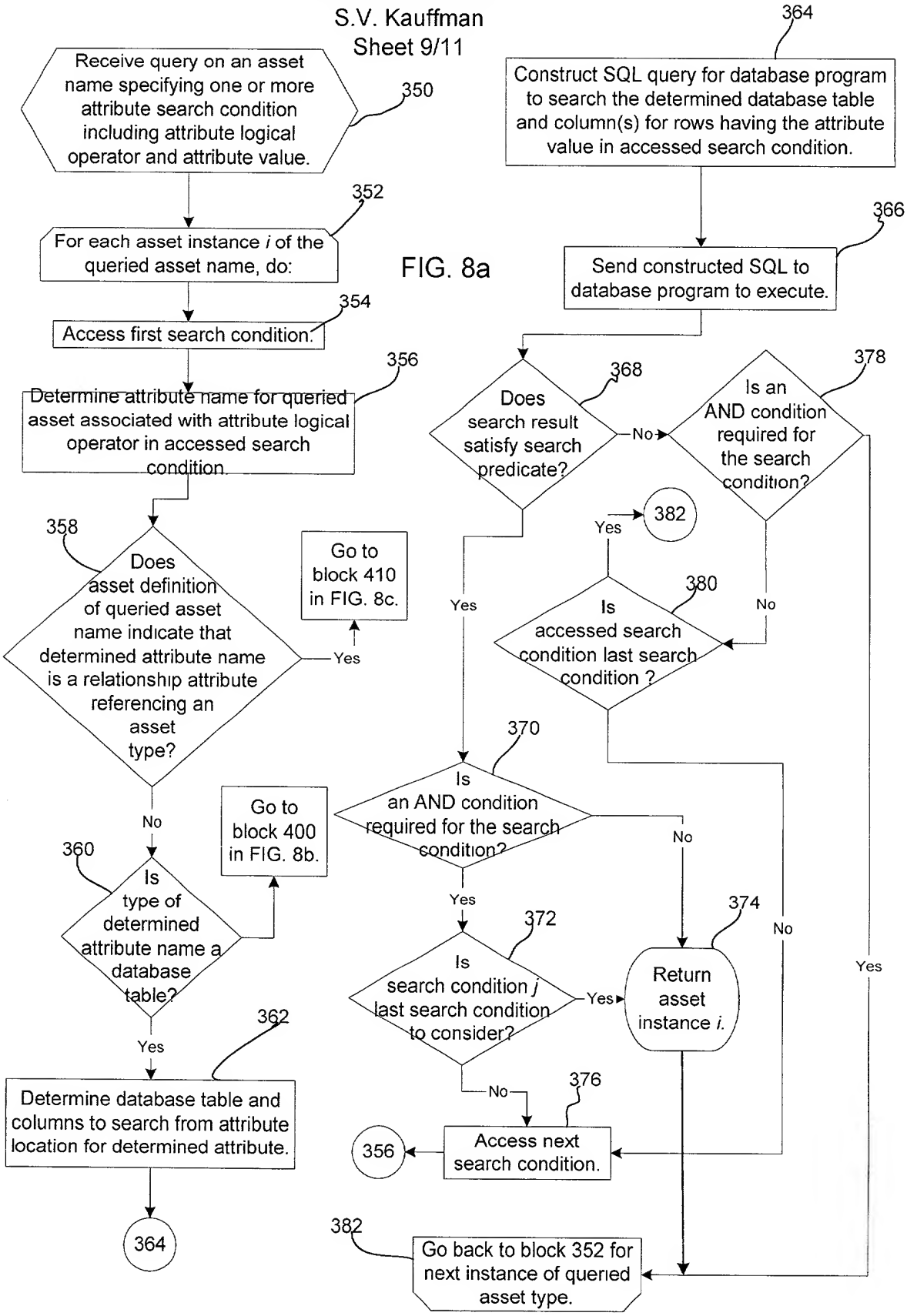

Receive query on an asset name specifying one or more attribute search condition including attribute logical operator and attribute value.
350
For each asset instance i of the queried asset name, do:
352
Access first search condition.
354
Determine attribute name for queried asset associated with attribute logical operator in accessed search condition.
356
Does asset definition of queried asset name indicate that determined attribute name is a relationship attribute referencing an asset type?
358
Yes
Go to block 410 in FIG. 8c.
No
Is type of determined attribute name a database table?
360
Yes
Go to block 400 in FIG. 8b.
Determine database table and columns to search from attribute location for determined attribute.
362
364
Construct SQL query for database program to search the determined database table and column(s) for rows having the attribute value in accessed search condition.
364
Send constructed SQL to database program to execute.
366
Does search result satisfy search predicate?
368
No
Is an AND condition required for the search condition?
378
Yes
382
Yes
Is accessed search condition last search condition ?
380
No
Yes
Is an AND condition required for the search condition?
370
No
Yes
Is search condition j last search condition to consider?
372
Yes
Return asset instance i.
374
No
Yes
No
Access next search condition.
376
356
382
Go back to block 352 for next instance of queried asset type.

FIG. 8a

FIG. 8b

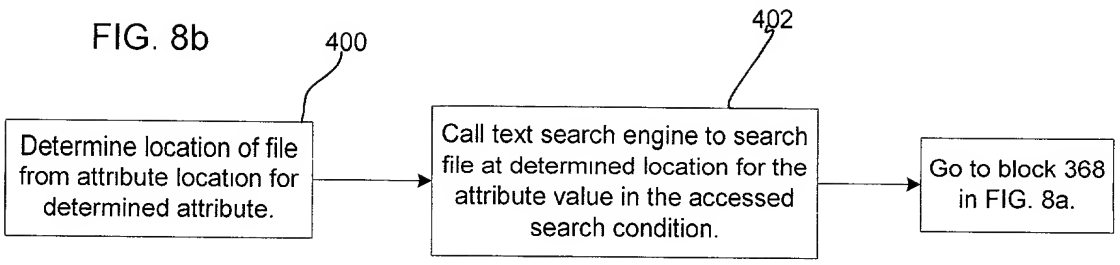

400
Determine location of file from attribute location for determined attribute.
402
Call text search engine to search file at determined location for the attribute value in the accessed search condition.
Go to block 368 in FIG. 8a.

FIG. 8c

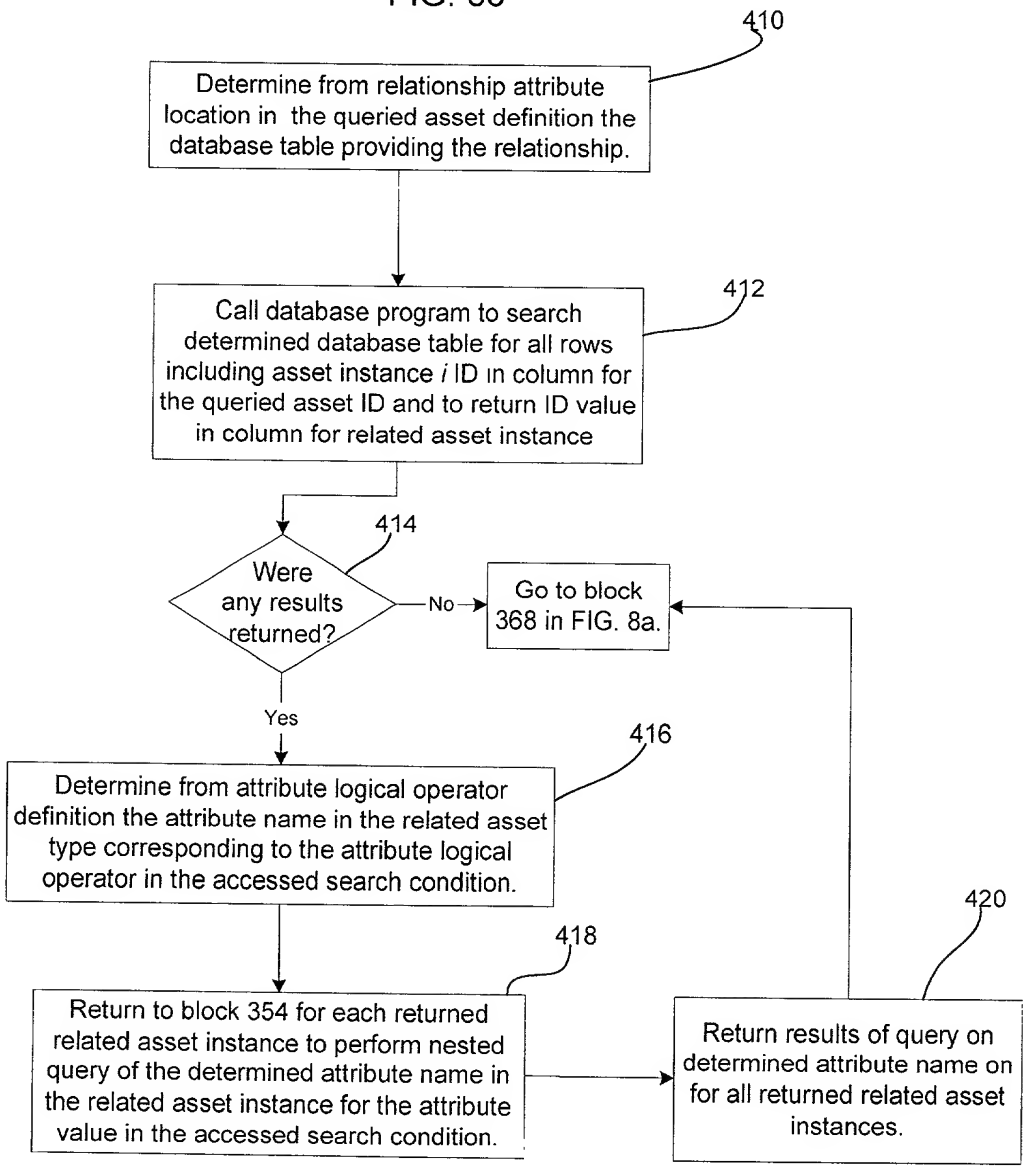
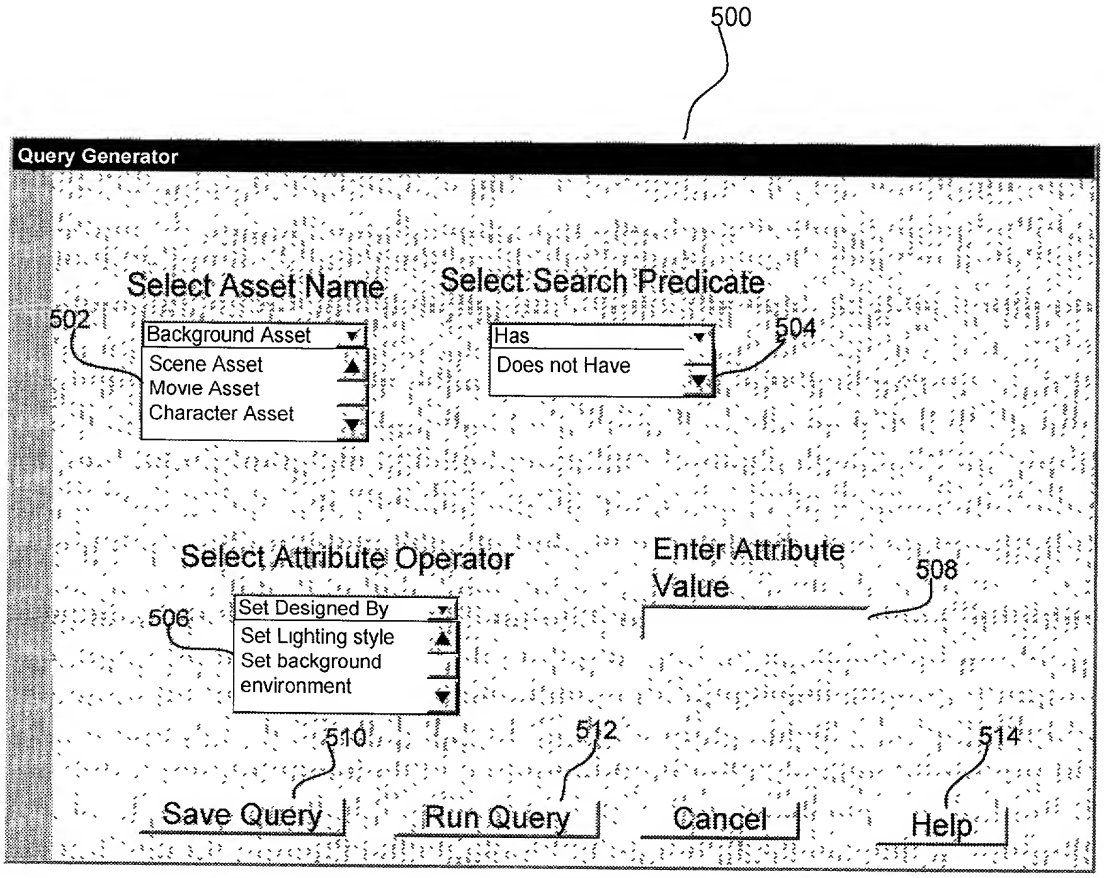

410
Determine from relationship attribute location in the queried asset definition the database table providing the relationship.
412
Call database program to search determined database table for all rows including asset instance *i* ID in column for the queried asset ID and to return ID value in column for related asset instance
414
Were any results returned?
No
Go to block 368 in FIG. 8a.
Yes
416
Determine from attribute logical operator definition the attribute name in the related asset type corresponding to the attribute logical operator in the accessed search condition.
418
Return to block 354 for each returned related asset instance to perform nested query of the determined attribute name in the related asset instance for the attribute value in the accessed search condition.
420
Return results of query on determined attribute name on for all returned related asset instances.

FIG. 9


500
Query Generator
Select Asset Name
Select Search Predicate
502
Background Asset
Scene Asset
Movie Asset
Character Asset
Has
Does not Have
504
Select Attribute Operator
Enter Attribute Value
508
506
Set Designed By
Set Lighting style
Set background environment
510
512
514
Save Query
Run Query
Cancel
Help